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ABSTRACT

A project described and examined the status of secondary trade and industrial (T&I) education in Virginia and made recommendations to improve such programs. Statewide enrollment data were retrieved for the school years 1986-87 through 1992-93. Questionnaires gathered concerns and recommendations of public school personnel about T&I programs. T&I teachers received a separate questionnaire that collected demographic information. Eight regional meetings attended by members of business, industry, and the general public were held. Focus groups and nominal group techniques were used to collect concerns and recommendations from these groups. A state task force was formed to review and analyze data and propose elements of a strategic plan for the long-range improvement of T&I education. Results indicated an eight percent decline in enrollment. Questionnaire respondents and meeting attendees identified the following concerns: funding, collaboration, teachers, and guidance. The project refined the purposes and related goals of T&I education and identified desired characteristics that focused on access, flexibility, and cost effectiveness. A preliminary proposal for an overall long-range redesign model had three basic components: an "instructional unit based" program component; teacher preparation and development component; and a program planning and evaluation component. Procedures for implementing the programmatic and teacher education ahd continuing development components were suggested. (YLB)

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A FIELD-BASED APPROACH TO VOCATIONAL EDUCATION REFORM

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FIELD-BASED APPROACH TO VOCATIONAL EDUCATION REFORM

Introduction

The Smith-Hughes Act of 1917 established Secondary level programs of vocational education. Programs which prepared individuals to enter trades and industrial occupations were among those supported by federal grants. The nation was changing from a rural society with an agrarian based economy to an urban society with an industrial based economy. This created a need for a large pool of trained manpower in the rapidly developing and expanding industrial sector of the economy. Technology was evolving at a relatively slow rate and even when available, it was not always applied to the workplace. Labor was often less expensive than the costs associated with applying new technology to the manufacturing process. Individuals could expect to spend most, if not all, of their working lives in a single occupation unless they chose to make a change.

In the schools a dual track system emerged, the academic curriculum and the vocational curriculum. Although the two curricula often existed in the same physical plant, they were separated by purpose, type of student, source of funding, and teacher preparation. The purpose of trade and industrial education (T&I) programs was to prepare students who would be entering the industrial workforce following school with the skills and knowledges they would need to obtain and maintain employment. Few of these students were expected to seek, or need, further formal education. Programs were highly structured, clock-hour based, and conducted in shops designed to reflect the actual industrial setting as closely as possible. The system was successful - students found jobs, industry prospered and the economy continued to expand.

The environment in which T&I programs operate today is very different than it was in 1917 or even 1960. Yet, to a large extent, T&I programs of today are planned, provided, and evaluated based on the model used to meet the needs of the individual, society, and industry of that earlier time. No single factor can be identified that has resulted in changes in the educational and workplace environments that make the current T&I model obsolete, rather, it is the interaction of a number of factors.

In the educational environment the primary factors are related to demographic trends and the education reform movement. Many local education agencies are experiencing declining secondary enrollments. Also, the ethnic/ racial mix of the secondary school population is changing - a much more diverse mix of cultures, values, and abilities is found in rural as well as urban settings. Access to educational programs and opportunities has become a major issue. The education reform movement, although it has not often addressed vocational education directly, has indirectly affected vocational education programs. T&I programs may in fact have been most affected by the changes resulting from the reform initiatives. Increases in the math, science, language requirements for high school graduation and college admission have decreased dramatically the number of electives students may take. Increasing academic requirements often force students to make decisions about post high school careers before beginning high school. The public debates over school choice, teacher certification, local control, and the like have changed the public's perception of what a good school or teacher is and what the purposes of public education should be. As a result, few traditional beliefs and models related to education have been unquestioned.

Rapid and equally dramatic change has also occurred in the environment outside the school. Of particular importance to T&I programs are those changes occurring in the work place. The number of jobs in the manufacturing sector of the economy is declining and will likely continue to decline. Interestingly, productivity has increased. The integration of technology into

the manufacturing sector is at least partially responsible for that phenomenon. The increasing technological sophistication of the work place has affected trades, occupations and professions differentially with regard to raising specific technical skill requirements. However, the levels of basic skills, particularly those generalizable to a variety of occupations, are increasing across the board. Experience, adaptability, social skills, and transferable skills are increasingly valued. Rapid and continuous technological change have created a work place in which learning and education are on-going endeavors. General education is important in obtaining and maintaining employment but technical education, in particular, is increasingly important.

While there is no clear agreement as to how T&I education should respond to these changes and prepare for those to come, it is very evident that immediate action is required. Continuing to use the current model or attempting to merely fine tune the current model will likely result in declining enrollments in T&I programs, increasing use of T&I programs as dumping grounds, and much debate over the value and relative cost of T&I programs. Changes in the very structure of T&I education are required if such programs are to remain a viable part of the public secondary school. All aspects of T&I education including curriculum, teacher licensure requirements, methods and locations of delivery, evaluation, scheduling, academic requirements, and program purposes must be examined.

Purpose and Objectives

The project ***An Analysis of Trade and Industrial Education in Virginia and Recommendations for Improvement*** began in the Spring of 1994. It was conceived as a joint effort of the Virginia Department of Education and concerned citizens including trade and industrial education practitioners, school administrators, counselors, other school personnel, lay citizens, and representatives of Virginia business and industry. The purpose of the project was to describe and examine the status of secondary trade and industrial education in the Commonwealth and make recommendations to improve such programs. More specifically, the objectives of the project were:

1. Determine the enrollment trends and patterns in T&I programs,
2. Compare Virginia's enrollment trends and patterns to other states and national trends,
3. Identify and summarize major areas of concern and the specific areas of concern of T&I stakeholders had regarding T&I programs,
4. Identify and summarize recommendations for change of T&I programs and delivery, and
5. Develop a strategic plan for the improvement of T&I education in Virginia.

Procedures

Statewide enrollment data were retrieved for the school years 1986-1987 through 1992-1993 (Data were missing for the 1988-1989 school year). Questionnaires were used to gather the concerns and recommendations of public school personnel about T&I programs. A wide variety of personnel were surveyed although more than 50% of the respondents were T&I teachers. T&I teachers also received a separate questionnaire which collected demographic information such as formal education, trade experience, teaching experience, retirement plans and so forth. Eight regional meetings were held throughout the state. Members of business, industry and the general public were invited to these meetings. Focus group and nominal group techniques were employed to collect concerns and recommendations from these groups.

A literature review was conducted and phone interviews with personnel in other states were also conducted to identify trends, practices and reform efforts occurring outside of Virginia. Two national efforts conducted by the National Center for Research in Vocational Education were also reviewed and evaluated.

Finally, a state task force composed of persons from business, industry, education at all levels and state department personnel was formed. The task force was charged with reviewing and analyzing all of the data collected and summarized by the project and with proposing the elements of a strategic plan for the long-range improvement of T&I education. The task force was actively involved in structuring the data collection effort including the regional meetings.

Analysis

Enrollment data were compiled statewide overall and by occupational clusters and individual occupational programs. Regional data were compiled in a similar manner. Enrollments for joint vocational centers and for the programs within these centers were also compiled. Enrollment change was analyzed within programs and clusters for regions and statewide. These trends were compared with trends within grades 10-12 across the state and within regions which served as benchmarks for overall enrollment trends and patterns.

Concerns and recommendations were analyzed by developing categories as dictated by the data. Frequencies of concerns and recommendations within categories (themes) were used to summarize findings. These data were also compiled by the job classification of the respondent and comparisons were made among the different job classifications. Finally, the demographics of the responding T&I teachers were summarized using frequency tables and comparisons among regions were developed.

Two descriptive reports were developed and provided to the task force members. A framework for the strategic plan was based on their analyses of the data in these reports.

Results

Findings related to enrollments were presented in detail in Report One (*Trade and Industrial Education in Virginia: Enrollment Trends).* Gender and race/ethnicity breakouts of state and regional enrollments were also provided. Lastly, a brief review of national T&I trends was provided.

Trade and Industrial Education enrollments were presented in three areas. First, statewide data across and within clusters were presented. Second, data within the original eight superintendent's regions were presented. Finally, data for joint vocational centers were also presented.

Statewide data were presented for a seven year period (six years of data) overall, and within clusters and programs. The overall statewide picture was one of an approximately eight percent decline in enrollments. This is, however, less than the twelve percent decline in total enrollment in grades 10-12 during the same period. Possibly a more important factor for consideration was the enrollment gains and declines for specific programs and program clusters. Construction, Metals, Special Programs, and Cooperative (ICT) clusters evidenced enrollment decreases from 14.3% to 43.1%. Programs within clusters also revealed similar enrollment patterns to those of clusters. In some clusters, only a few programs make up the bulk of enrollments. For example, Electronics Technology, Graphic Communications, and Drafting made

up nearly 81 % of total enrollments in the Communications and Graphics cluster. Lastly, it was found that the gender representation of T&I programs tended to mirror the historic gender compositions of related occupational fields. No appreciable change in gender balance was found over the seven year period.

It was found that overall, while some common trends and patterns existed across regions, regional trends and patterns varied widely. Although total T&I enrollments declined in all but two regions, the total school enrollment in grades 10-12 declined statewide and within regions by similar or greater amounts. Likewise, the enrollment trends and patterns in joint vocational centers varied widely. These trends must be viewed with some caution, however, because of an unknown degree of multiple program enrollment by some students.

A brief review of national trends and patterns was included in this first report. Of particular interest were the enrollment trends in other states and those trends and policy recommendations included in the NAVE Final Report.

Summaries of information collected through regional meetings and questionnaires were presented in the second report entitled *Trade and Industrial Education: Analysis of Field Reports of Status, Problems and Recommendations*. These summaries of information focused on concerns and recommendations as perceived by general school administrators, vocational administrators, guidance counselors, T&I teachers, and representatives of Virginia businesses and industries. The report also provided summaries and analyses the general questionnaire and a questionnaire distributed only to T&I teachers.

Regional meetings were held in all eight superintendent's regions to identify concerns/factors affecting T&I education. A nominal group process was used in six regions and focus groups were used in the remaining two regions. The following is a list of the concerns in rank order as provided by the participants: Image, Funding, Curriculum, Programs, Teaching, Collaboration, Guidance, Students, and Labor Market.

Report Two next examined the results of a general survey administered to 572 individuals associated with secondary T&I education in Virginia. There were 1415 concerns expressed to the question *"What do you consider to be the three biggest concerns in Trade and Industrial Education at the present time in your school, division, or center?"* Nine themes emerged from these data and were used to summarize responses.

The highest percentage of concerns stated overall (regardless of job classification) was in the area of funding (22%). The lowest percentages of concerns were expressed in the areas of Collaboration (03%), Teachers (04%), and Guidance (04%). Moderate percentages of concerns were expressed in Administration (14%), Students (12%), Image (11%), Enrollment and Placement (10%), Curriculum (09%), and Programs (09%).

Since the number of respondents and concerns expressed varied widely according to job classification, the overall percentages tend to reflect most heavily the input of persons in job classifications with the largest number of respondents (in this case, T&I teachers). For this reason, the percentages of concerns by each job classification should be examined. There was general agreement among the groups in the areas of Image, Funding, Collaboration, and Guidance.

Report Two next examined recommendations for change by job title. There were 1305 recommendations expressed in response to the question, *"What do you think are the three changes most needed to improve Trade and Industrial Education in your school, division, or center?"* Across job classification, the highest proportion of recommendations fell in the categories of Funding, Administration, Programs, Image, and Collaboration. The lowest

proportion was found to relate to enrollment/placement. When recommendations were examined by job classification, all except counselors made more recommendations for change in the funding category than any other.

No attempt was made to obtain a scientific sample of T&I teachers. However, the responses could be useful for planning purposes. Overall, the respondents were largely non-degreed experienced tradespersons. Approximately 20 percent of the responding T&I teachers were planning to retire in five or fewer years.

Recommendations

Based on the Task Force's analyses of the two reports summarized above and their recommendations, a preliminary proposal for an overall long-range redesign model with three basic components was prepared by project staff then endorsed by the Task Force. The three components included: (1) An "instructional unit based" program component, (2) Teacher preparation and development component, and (3) A Program planning and evaluation component. Prior to presentation of each of these components in detail, the revised purposes and related goals for T&I education and desired characteristics used to develop the total proposal are presented. The desired characteristics focus on access, flexibility, and cost effectiveness. Each of the model components also has its own specialized guiding characteristics which are presented with the description of the component. This proposal was developed after analyzing enrollment data, input by regional meeting participants, recommendations by the Task Force, information obtained from selected states, and data from national studies of Trade and Industrial Education.

Refinement of the Purposes and Related Goals of T&I Education

Purposes/outcomes are considered to be the broad reasons for existence of T&I programs at the secondary school level. Related goals are defined as desirable, perhaps necessary, goals that should be accomplished by contemporary T&I programs.

Purposes:

1. Entry level job preparation
2. Preparation for more advanced technical and academic training and technical careers.
3. Adult education and retraining/updating
4. Career exploration, orientation , development, and guidance

Related Goals:

1. Transferrable academic and technical skills
2. Enhancement of basic and more advanced academic skills
3. Leadership, problem solving, planning, and group work skills
4. Employability skills and work values
5. Entrepreneurship skills
6. Basic tool and machine skills
7. Community Service
8. Technological, industrial and tool literacy
9. Promotion of the importance of technical training, programs, and personnel

Desired Characteristics

Input from T&I teachers, vocational administrators, general school administrators, guidance personnel and representatives of business and industry provided fairly consistent

descriptions of desirable characteristics of T&I programs for the future. Those which emerged most strongly and consistently across regions and personnel types are included in this section as "desired characteristics" to provide guidance for model development. These characteristics appear to fall naturally into three broad areas: (1) Access, (2) Flexibility, and (3) Cost effectiveness.

1. Access: Programs should:
   a. Appeal to and be available to a broad spectrum of youth and adults with differing backgrounds, abilities, interests and career patterns/goals.
   b. Not be restricted by design, curriculum or methods to particular student populations or traditional industry classifications.
   c. Be designed to serve the diverse needs of students, employers and educational agencies at the state, regional and local levels.
2. Flexibility: Programs should:
   a. Be of differing lengths and/or have multiple entry-exit points to meet individual and business/industry/labor needs
   b. Utilize academic and technical offerings of the home school, other schools, local community college(s) and cooperating businesses and organized labor to develop and deliver individualized career preparation programs
   c. Be "customizable" to local school and labor market conditions
   d. Be initiated, expanded or terminated based on demonstrated need through approved planning and evaluation procedures
   e. Be scheduled and located to accommodate the needs of youth, adults, and area businesses and industries
   f. Be based on standards recognized by postsecondary institutions, business/industry and labor and professional organizations. To the extent appropriate, they should be based on emerging national skill standards
   g. Be of differing levels of occupational specificity to meet exploratory, development and advanced training/retraining needs of individuals.
3. Cost Effectiveness: Programs should:
   a. Meet cost-effectiveness criteria based on appropriate student, labor market demand, facility, and funding criteria while meeting local educational goals.
   b. Be delivered in the most cost effective manner through collaboration among schools, school divisions, community colleges, business and industry and through application of appropriate instructional technology and methods.

<u>The Programmatic Component</u>

To meet the requirements established by the design characteristics discussed earlier, the programmatic component of the model must exhibit several specific characteristics

1. The programmatic model must accommodate the needs of a widely diverse clientele.
2. Variety in both depth and breadth of instruction and experience must exist within programs.
3. Instruction and experience should utilize appropriate community resources and not be limited to just those available in the school or through traditional co-op experiences nor to traditional times.

4. Entry and exit from programs should be possible at a variety of points and not necessarily be based on clock-hours.

5. All participants must be prepared for work *and* further education.

The characteristics of the *traditional* programmatic component in T&I education are: (1) Program based (2) Occupation focused, and (3) School based. The primary reason that the existing structure cannot achieve the multiple characteristics discussed above is that the traditional model is *program based*. Although the fact that most programs are occupationally focused does limit the flexibility of the traditional model, merely broadening that focus will not allow achievement of the desired characteristics

The Instructional Unit Based Approach. A major change in the structural base of T&I programs is required. The fundamental requirement is to change from a program based model to an instructional unit based model. An instructional unit was defined as a logical combination of technical, skill, and employability competencies which is normally a sub-set of existing course content. An instructional unit based model would make T&I programs more compatible with other segments of the secondary curriculum. More importantly, however, only through an instructional unit based approach to T&I programs can the basic design goals of increasing access, increasing flexibility, and improving cost effectiveness be achieved. Dividing current T&I programs into logical curriculum components called instructional units is key to achieving those goals although that alone will not guarantee their achievement.

Once existing programs have been divided into their instructional units, it will be possible to offer instructional blocks of varying length. No longer will students be forced to make all or nothing decisions when deciding whether to enroll in T&I programs. Additionally, it will be possible to identify the common elements of various programs and consolidate those common elements into a single instructional unit when appropriate.

Thus an instructional unit based model would increase the numbers and types of students having access to T&I offerings. Increased access would allow a larger number of students to fit T&I offerings into their schedules. Also, students would be able to develop an educational program that was compatible with their short and long term goals by including T&I offerings as appropriate. Administrative changes must occur if that flexibility is to become reality.

Cost effectiveness can be improved by eliminating unnecessary overlap and duplication. Dividing T&I programs into their basic curricular elements allows the identification of common elements. Once those elements are identified, decisions can be made regarding where they are best taught and by whom. As a result, it is likely that improved and more effective delivery of T&I offerings will occur. Moreover, it is very likely that duplication across service areas within vocational education will also be identified.

Levels of T&I Instruction. It is also proposed that several levels and types of T&I instructional units be developed. The first level should be designated as the *Orientation* level. These instructional units are exploratory and are focused upon clusters of occupations and should include both a school-based and a community-based component. The school-based component should include instruction and experiences that allow students to investigate the nature and requirements of occupations coupled with actual laboratory activities where required skills are introduced and used. The community-based component of the orientation level instructional units should focus on providing students with opportunities to experience occupations within their actual environment through such activities as field trips, shadowing, and simulations. It is important to emphasize that the clientele of orientation level units is not restricted to middle school students. Secondary school students, post-secondary students, and adults may also benefit

from them. The specific processes and procedures used would be tailored to the clientele and its needs.

The second level of instructional units is designated *Cluster*. Two overlapping emphases are available at this level, *skill orientation* emphasis and *technical emphasis*. The basic core skills, attitudes, and knowledges common across the occupations in a cluster are included. It is possible that one or more groupings of core skills might be developed which are pertinent across several or all clusters. However, the vast majority of cluster level offerings are technical units. Technical offerings focus upon developing specific skills and knowledges. These may be unique to a single occupation or common to several. Units will vary in hours of instruction depending upon the particular skills and knowledges being taught. School-based components of the offerings at this level include technical and academic courses and internships while the community based components utilize mentorships, internships, cooperative experiences and the like. This approach would allow the customization of programs to meet the needs of various clientele and/or localities. Clientele for Cluster level offerings are Secondary students, out-of school youth, post-secondary students, and adults. When and where these instructional units would be offered would be based upon the needs of the clientele group.

The final level of offerings is designated Capstone. The purpose of instructional units at this level is to provide very specific, and often very intensive, experiences in a single occupation. Immediate entry into the occupation or transfer to a closely related postsecondary technical program should be the most common goals of students enrolled in such experiences. Capstone offerings can be school based and while they might occur in the home school, neighboring schools, area schools, joint centers, and community colleges all have potential for offering such experiences. Community based offerings could use pre-apprenticeship and apprenticeship programs, employer based co-op, and other such programs. While secondary students, post-secondary students, and adults are the clientele of these offerings, their nature and purpose restrict them largely to those planning to enter the workforce or advanced technical training immediately following completion.

<u>The Teacher Preparation and Continuing Development Component</u>

The acquisition, training, continuing development and retention of quality T&I teachers has been an area of considerable concern across the country as well as within Virginia. Trade and Industrial Education has traditionally operated with a teacher preparation/licensure model that is different from other academic and vocational areas. This model was developed to serve trade and industrial education during the early years of this century. This was a period of rapid industrialization and a time when the primary focus was on preparing individuals for entry into clearly defined trade areas and factory production systems. Occupational areas, production systems and educational requirements have undergone dramatic changes during the ensuing years but the basic approach to the preparation and continuing development of T&I teachers has largely remained as originally conceived.

Input from regional meetings, employers, T&I teachers, administrators and Task Force members indicates that this model has become increasingly inadequate to the challenge of supplying the required number of professional staff who have both the <u>technical</u> and <u>pedagogical</u> competencies needed. The design characteristics which follow were developed from both the problems and recommendations provided by educational and business personnel from across the state.

Desired Characteristics

1. Teacher education services should be decentralized and accessible to those needing technical and pedagogical preparation and upgrading
2. Both pedagogical and technical skills should be included as required components of teacher preparation/certification requirements
3. Delivery should be based on a "trainer of trainers" concept rather than a centralized university delivery model
4. The system should be designed to lead toward a minimum requirement of an Associate of Science Degree with seamless progression to the Bachelor of Science Degree for full licensure.
5. The system should involve collaboration among selected universities, community colleges and vocational centers/programs.
6. The system should provide for multiple levels/types of licensure including general (exploration/orientation), multioccupational (cluster), include add-on specializations for advanced occupational preparation programs (single occupation, co-op, dual enrollment, advanced technical) and for administration and supervision.

The Planning and Evaluation Component

This component overlaps the programmatic component in that reconstruction of the curriculum necessarily involves extensive planning and a differentiation of evaluation requirements. Students who enroll in T&I education have widely varying levels of career maturity, academic skills, and aptitude. At a minimum, instruction should be able to accommodate students who desire direct entry to the labor market upon completion of secondary school and students who want to continue their technical and academic preparation. For this reason, a major goal of curriculum redesign is to develop instructional units in such a manner that two overlapping emphases are built into the curriculum, namely: a) skill emphasis and b) technical emphasis. This approach would not necessarily apply to the Orientation level but would be highly desirable for both cluster and capstone experiences. The "skill" option would provide greater focus on the development of immediately marketable skills. The second option, "technical" would focus more on background theory, required advanced academic skills, and postsecondary entry. The advantage of having these two options built into the curriculum is that it continues to hold open the possibility of advanced technical training for those students who have originally elected job entry preparation and allows those originally planning further education to enter the labor market should their personal circumstances change.

A second dimension of the curriculum planning and evaluation model is called the program status dimension. It is proposed that programs (a program is defined as a planned, coherent sequence of instructional units and academic courses) might have one of two status classifications, namely: a) standard, and b) innovative. "Standard" programs are those which have approved uniform statewide course components, developed curriculum guides, competencies, and facility and equipment specifications. "Innovative" programs provide for a gradual evolution of T&I through provision for experimental programs as proposed by individual school divisions or consortia. An innovative program is any new program or substantive revision of a standard program designed to meet local or emerging needs. Innovative programs are approved on a temporary basis (with enhanced planning and evaluation requirements) for a period of not more

than three years. With satisfactory completion of these requirements, the new program would be considered for adoption as a new "standard" program.

The third dimension of concern in the planning and evaluation model is the relationship of planning and evaluation to occupational specificity. It is proposed that planning and evaluation requirements be differentiated according to the level of occupational specificity of the program. The curriculum for orientation units lends itself to standardization across the state and can therefore include uniform planning and evaluation requirements, with evaluation focusing on knowledge acquisition and career development. Cluster units, which may vary to some extent according to the region of the state, should have similar evaluation requirements but should also be tailored to these differences. Capstone units, on the other hand, should be highly sensitive to the local/regional labor market and would therefore include enhanced planning and evaluation requirements. These requirements should include a comprehensive needs assessment in the planning/approval cycle and a greater emphasis on follow-up and related placement in the evaluation cycle. Another way of depicting this continuum is that the more occupationally specific the instruction, the more it has to be justified on the basis of local/regional need and placement rates.

It is envisioned that rural schools might have a similar complement of orientation units to that offered in more metropolitan areas, somewhat reduced scope of cluster units and perhaps limited capstone offerings, focusing on those which can be offered primarily through co-op or pre-apprenticeship rather than in-house laboratories. In some areas, ICT may be the primary methodology for capstone level instruction.

Procedures Recommended To Implement The Programmatic Component

Step One - Identify Modules/Units/Courses. The current program-based curricula must first be broken into logical instructional units. These units are developed by identifying related skills and theory. Some of the units may be one grading period in length while others may encompass an entire semester. A logical beginning point is the units or duty areas identified in current curricula. This activity also presents an excellent opportunity to examine current curricula and make modifications as required to align what is taught with what should be taught.

Step Two - Identify Supporting Academic Skills. Those academic skills required to both succeed in each instructional unit and to proceed with further education need to be identified. The academic courses which contain those skills must also be identified. These academic courses become an integral part of the program.

Step Three - Identify Overlap/Duplication Between Existing Programs. Overlap exists among current T&I programs; in fact, some overlap exists between T&I programs and vocational programs in other service areas. Once these overlapping skills and knowledges are identified, decisions can be made regarding where they are best taught and by whom. Some coordination with other vocational service areas is likely to be necessary during this step.

Step Four - Identify Delivery and Structure Alternatives. Identify the resources which exist in the schools and the community to provide instruction and learning experiences. Also identify scheduling requirements and alternatives necessary to utilize those resources.

Step Five - Combine Units Into Programs. The instructional units that should be combined to make up a career program must be identified. Academic and vocational requirements must be included. The challenge of this step is to identify the absolute minimum requirements to adequately define a viable program while allowing flexibility to customize programs.

The steps outlined above are most directly applicable to the Cluster and Capstone level offerings but with slight modification can be applied to the Orientation level offerings as well. Initially teams of T&I teachers and industry representatives in each specific program must be formed to break down each particular curriculum. Teams which combine T&I teachers from related programs, academic teachers, teachers from other vocational service areas, representatives of business, industry, and labor, and administrators will be necessary to identify academic requirements, overlap/duplication, and delivery and scheduling alternatives. Finally, State Department of Education personnel must be included in the process of defining programs. Effective execution of the process will require careful coordination. The State Department of Education is the best equipped agency to act as a central clearinghouse and coordination center.

Procedures Recommended to Implement the Teacher Education and Continuing Development Component

Trade and Industrial teacher education and continuing development services should be collaboratively developed and delivered by universities, selected community colleges, vocational centers/school divisions and the private sector. The traditional university-based, field-delivered T&I teacher preparation program is no longer cost effective nor adequate to the needs of the field. Many community college and school division personnel have strong pedagogical and technical competence but these personnel are not currently used in teacher preparation and upgrading. In like manner, up-to-date technical, organizational and management expertise resides in businesses and industries throughout the Commonwealth. A decentralized, cost-effective approach to T&I teacher education and development could be accomplished through the following steps or actions:

a. Define the broad areas of pedagogical and managerial competence required for licensure at Orientation, Cluster and Capstone levels. Define unique competencies required for administrative and supervisory certification. (Collaborative effort by university, technical/trade and industrial personnel)

b. Define technical competencies/experiences critical to teaching in broad and specific occupational areas and levels (Orientation, Cluster, and Capstone). (Collaborative effort by Technical, T&I and industry representatives)

c. Develop a "trainer of trainers" program to prepare field-based, certified instructors for delivery of pedagogical preparation and technical training and up-dating. (Teacher educators in collaboration with teachers, administrators, and industry representatives)

d. Develop new licensure requirements based on the program model adopted through the restructuring effort and incorporating the decentralized teacher preparation and development model. (Joint task force of university, community college, and school division personnel)

e. Develop procedures and standards for acceptance of pedagogical and technical credit toward the AS and BS degrees. (Joint task force of university, community college, and school division personnel)

Conclusions and Next Steps

While this project is still in the early stages of implementation, feedback from the field has been largely positive. T&I teachers and other school and business/industry personnel have been very helpful and have given their time generously. The Task Force has provided continuing input

and guidance to the project staff and Virginia Department of Education leadership personnel. Funding is extremely tight and policy actions on both federal and state levels will no doubt affect the ultimate outcomes but there is a sense of optimism that over the next several years, T&I education will benefit from the present efforts.

Pilot schools will be selected this year and implementation will begin on a small scale with continuing adjustment and evaluation over the next two years. As the restructured approach to T&I education is refined through pilot school and continuing Task Force input, recommendations, procedures, and professional development programs to facilitate expansion to additional schools will be developed.

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